

SPACEWATCH

the newsletter of the Abingdon Astronomical Society

11th February 2013

Dr Allan Chapman
(Wadham College, University of Oxford)

'Johannes Hevelius, 1611-1679:
Observer of the Moon'

Maybe the Mayans knew about 2012 DA14 when they predicted the end of the world, but their 16-bit calculations got the date a bit wrong and the path of this 40-metre diameter rock too which will whistle past the Earth this coming Friday evening. If it's clear we will in fact be able to see it moving slowly against the background stars – at least in binoculars. It's a sober reminder that there are lots of these rocks, some smaller, some larger, and one day, we won't be so lucky.

THE NIGHT SKY THIS MONTH

by Bob Dryden

Mercury: Currently undergoing an excellent evening apparition, Mercury reaches greatest eastern elongation on 16th February. That evening the planet will shine at a bright magnitude -0.5, will be about 15° high at sunset, and will not set for nearly 90 minutes after the Sun. This means it should be easily visible to the naked eye low in the south west. Following greatest elongation, Mercury fades rapidly. Just one week later it will be a much fainter magnitude +0.6 and will be slightly lower, making it rather more difficult to find without binoculars. You will probably have great difficulty finding the planet at all after that and inferior conjunction occurs on 4th March. On the evening of 11th February there will be a thin crescent Moon just to the right of Mercury.

Venus: Heading towards solar conjunction, Venus is now too deep in morning twilight to be seen.

Mars: Technically on view in the evening sky, in reality Mars is too faint at magnitude +1.2 to be seen as it is too close to the Sun.

Jupiter: Jupiter continues to dominate the evening sky as it blazes away at magnitude -2.3 high in Taurus. In mid-February the planet culminates (i.e. reaches its highest point in the sky in the south) at around 19.00 UT at a whopping 60° above the horizon. By mid-March culmination happens at the earlier time of 17.00 UT. So you have plenty of time to have a look at the planet before it gets low down. On 18th February the bright gibbous Moon is close to Jupiter.

Saturn: Rising just after midnight in mid February, Saturn is of course a late night/early morning object. Fortunately, the rising time is moving slowly towards the evening, and by mid March the planet appears around 22.30 UT. Now crossing Libra, Saturn is never going to get very high in the sky from

the UK. In February it culminates at approximately 05.30 UT but has barely reaches 25° above the horizon. This means the telescopic views will not be great, but a telescope will have no problem in revealing the rings as they are at an angle of 19°. Shining at magnitude +0.4 the planet is an easy naked eye object, but if you want a guide then on 2nd March the gibbous Moon will be just to its right.

Uranus & Neptune: Uranus is still viewable for a short while in February towards the south west in Pisces. It will not be an easy target for long as it is approaching the evening twilight and at magnitude +5.7 the planet will rapidly disappear. Neptune is too faint and too low to be seen now.

Occultations: On 23rd February there is an interesting, but difficult group of lunar occultations. At 17.39 UT the Moon covers magnitude +5.9 50 Cancer and at 22.59 UT it does the same to 60 Cancer. In-between these two events, the magnitude +6.9 open star cluster M67 is occulted. Unfortunately, the Moon is only 2 days away from being Full so these occultations will probably be very difficult to see but it is not often a Messier object is occulted so perhaps you should try. At 17.39 UT the Moon will be about 18° high in the east and by 23.00 UT it will of course be high in the sky. On 4th March a more easily visible occultation of the magnitude +3.9 star Omega Scorpius takes place. The downside is it occurs at 02.33 UT. The Moon will be rather low at 9° altitude in the south east. The phase will be Last Quarter and the star will go behind the bright limb, and then reappear from behind the dark limb at 03.11 UT.

Asteroids: The dwarf planet **1 Ceres** continues to be on view in the evening sky as it move across Taurus, approaching the Taurus/Auriga border. It is now fading and reaches magnitude +8.4 by March.

4 Vesta is also in Taurus, only slightly further west near the Hyades cluster. Shining at magnitude +7.6 in February it is more easily visible than Ceres. Binoculars should enable you to find both of them.

On the night of 15/16th February an unusual event occurs as a small asteroid passes very close to the Earth and you will be able to actually watch it move amongst the stars in real time. Sadly, closest approach occurs before the asteroid has risen here in the UK. The asteroid is **2012 DA14** and it is going to come as close as 31,000 kilometres which in astronomical terms is a very close call. It will rise at about 20.00 UT (8pm) in Virgo and will be 6th magnitude making it an easy binocular object. As it will be moving at half a degree per minute, you will be able to watch it actually move against the stars. As time progresses, the asteroid will appear to fade slightly and slow down a bit - this is the result of it actually moving

away from the Earth. By 9pm it will be Coma Berenices and by 21.30 UT it will be close to Beta Com and will have reached 7th magnitude. It will then move through Canes Venatici and into Ursa Major by which time it will have faded to 9th magnitude. This is quite a rare event so try to see if you can see it.

Comets: If you like to make observations before the Sun rises then in March there is a comet you might like to try for. Comet C/2012T5 Bressi becomes visible in the morning sky in the first week of March. On 1st March it is in Capricornus at 4th magnitude but it rises barely 30 minutes before the Sun so will be an extremely difficult object. By 11th March it will be about 20° high in Pegasus at sunrise making it much easier to see. It will have faded to magnitude +6.7 by then but it should still be an easy object to find.

The other comet that may be visible this session is one of two that are eagerly awaited this year. Comet 2011L4 PanSTARRS finally reaches perihelion on 10th March and then moves into the evening sky. It will be very low in south west close to the Cetus/Pisces border and will set within an hour of the Sun. How easy will it be to see it? Who knows at the moment. Some predictions say it will be a bright naked eye object, and it may (or may not) have a bright tail. It is expected that it will be a good comet, no matter which predictions are correct - it is possible that it will be a great comet, so make sure on the 11th March (you can try on the 10th but it may still be too close to the Sun, unless it is extremely bright of course!!) you have a look.

MOON PHASES:

New: 10th Feb.; First Qtr: 17th Feb.; Full: 25th Feb.; Last Qtr: 4th Mar.; New: 10th Mar.

LAST MONTH'S MEETING

by Gwyneth Hueter

Professor John Miller (Oxford University) gave us a real mind-boggler of a talk on gravitational-wave astronomy, the latest advance on visual then radio then X-ray astronomy.

Gravitational-wave astronomy will hopefully enable us to get a better understanding of dense and compact objects such as neutron stars and black holes as well as a better view of the very early universe.

So how do we feel the gravitational effect of a distant source? Einstein said gravity results from the curvature of space-time. A good analogy is a rubber sheet with a weight hanging from the middle and a marble being rolled across the sheet. If the central object moves as a result, it sends little waves out, and these are the gravitational waves. They are yet to be observed in practice, even though General Relativity shows they must exist.

Joe Weber in the very early 1970s tried to detect them, with a solid 2m long cylinder which he hoped would resonate to the commonest gravitational waves.

Gravitational waves are tensor waves and not like electromagnetic radiation, i.e. they stretch and squeeze spacetime.

We are finally beginning to work out how to make better sensors, using modified beamsplitters, like the Michelson interferometer that helped us to measure the speed of light nearly 100 years ago. The light beam is sent a large distance and mirrors split the beam. The two beams are sent large distances then recombined, any gravitational waves will cause the wavelengths of the recombined light to be minutely different. However, unlike light, which spreads over distance in a logarithmic scale, gravitational waves spread by half as the distance doubles.

This means that once we do finally detect them, then we should find it relatively easy to detect them out to vast distances.

The strongest sources are likely to be black holes merging or gamma ray bursters, which are black holes inside a torus of material.

Sad to say we have no mergers due in the near future. The best candidate for a big bang is a merger between the two pulsars in PSAJ0 737-3059, due anytime in the next 85 million years.

We have a surfeit of acronyms when it comes to gravitational wave detectors. Best known are LIGO (in the USA) and Virgo (in Italy), based on the beamsplitter design. The most adventurous one will be LISA (laser interferometer space antenna), which will consist of three satellites following Earth's orbit round the Sun, forming a triangle with sides of five million km. Construction of this is on hold at present, because of funding cuts. If it is built, it will hopefully be able to detect the aforementioned high intensity black holes, and neutron stars, but also it will be able to see the universe when it was only about 300,000 years old. This would be after the inflationary period, but before matter existed as we know it, before cosmic nuclear synthesis began. Before the decoupling of gravitational radiation and matter, as it is known. Phew!

FURTHER DISCUSSION

Why not take a look at our new website? Ian has been working hard over the summer to update the website and make it a little more interactive. It's at the same address: www.abingdonastro.org.uk.

If you are not already on our internet mailing list, then why not log on to YahooGroups. The list is called 'abingdonas'. Members use the list to alert each other about celestial events and to chat about amateur astronomy. The list is quite active, with several messages most weeks. To read through previous messages click on:

<http://groups.yahoo.com/group/abingdonas/>.

To join the abingdonas list, please go to <http://www.yahogroups.com>. You can also unsubscribe from the list here.

To post messages to the list, please send them to abingdonas@yahogroups.com. Please note that you

will need to sign up with a YahooID if you do not already have one. You can do this on the above page.

Further information about the mailing list can be found on the abingdonas webpage at :

<http://groups.yahoo.com/group/abingdonas/> .

Further discussion on astronomy and many other topics takes place at the Spread Eagle pub in Northcourt Road after the main meetings. You are most welcome to join us.

DATES FOR YOUR DIARY

18th Feb. 8pm Beginners' Meeting in the Perry Room.

4th-6th Feb. 8pm (first clear night) Observing evening at the White Horse, Uffington. Ring Ian on 07557 373401 to confirm on the night.

11th Feb. 8pm Talk by Grant Privett (Shropshire AS), '10 Things to See'

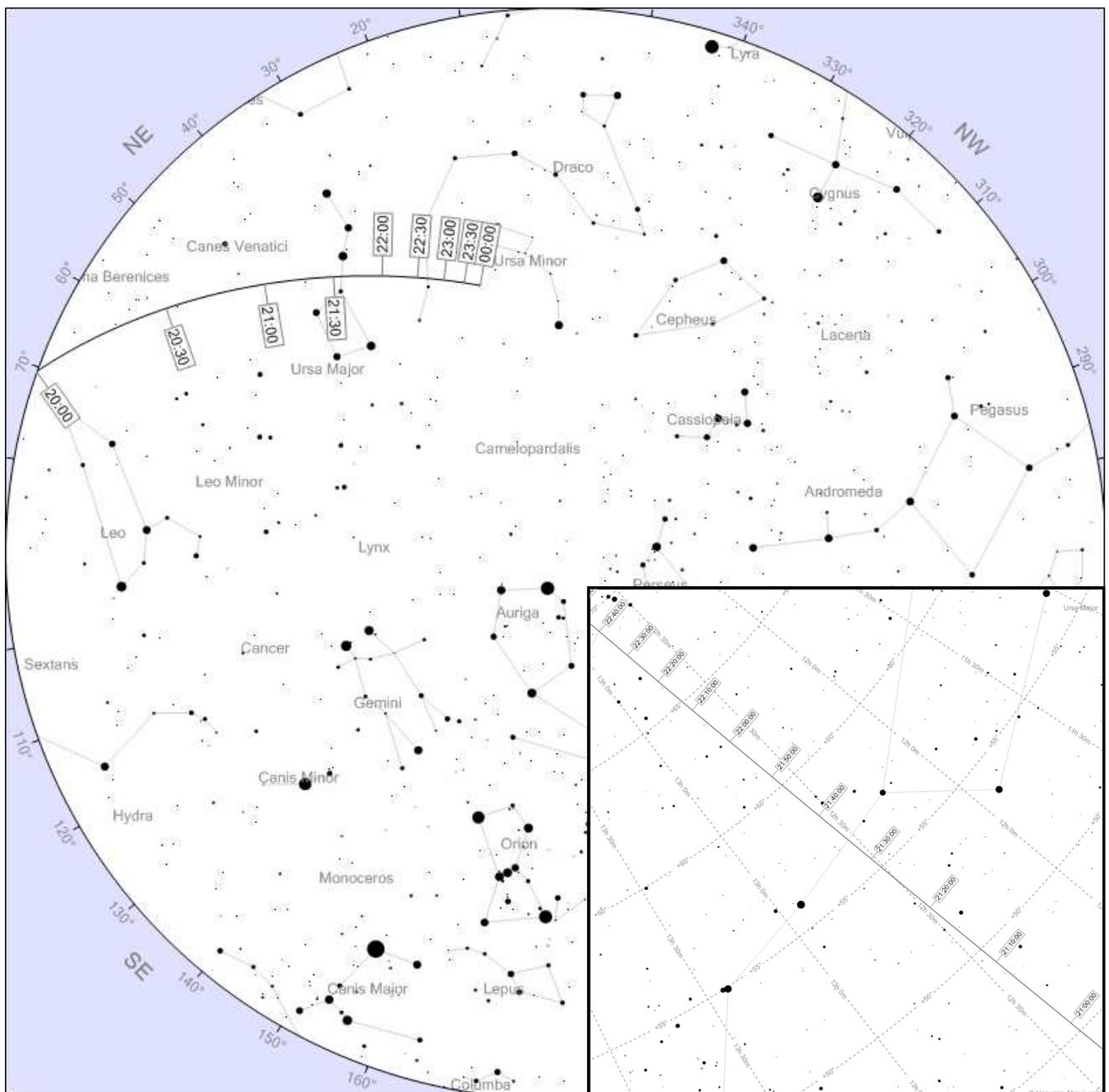
The editor of "SpaceWatch" is Andrew Ramsey, who would very much appreciate your stories & contributions. Please send any news, observations, photos, etc. to:

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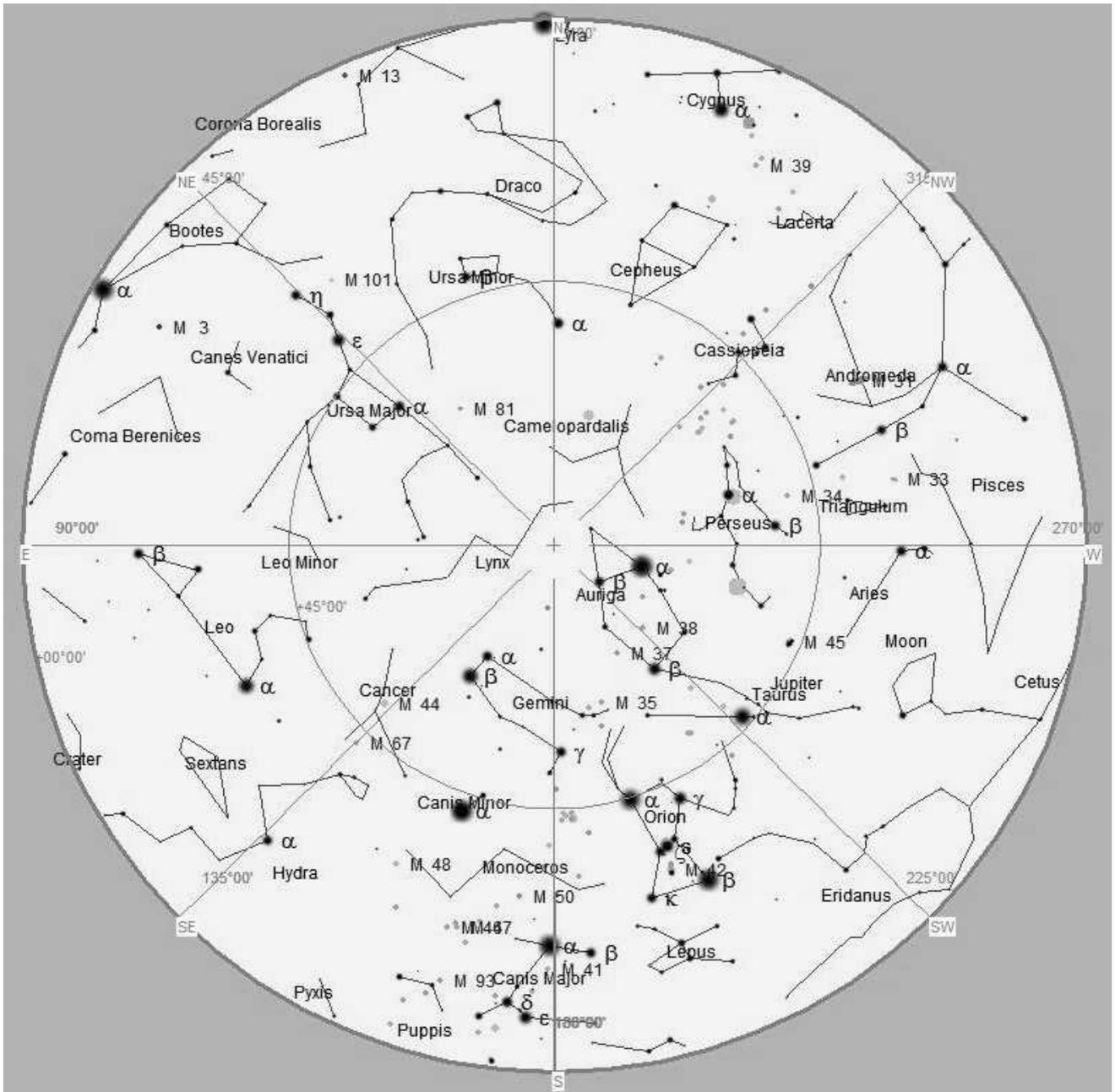
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Watch out on Friday evening as the Earth has a close encounter with an extra-terrestrial object, 2012 DA14. The insert shows the path through the handle of the Plough in Ursa Major at about 9.30pm. [Thanks to Heavens Above for the images (www.heavens-above.com) .



STAR CHART



The Night Sky at 9pm (GMT) next Saturday (16th Feb.)

Orion still dominates the south. Sirius is due south at this time. Procyon in Canis Minor, the Little Dog, is higher and to the left.

Gemini is above Procyon, easily identified by the twin stars Castor and Pollux. Capella in Auriga is almost overhead above Orion.

Looking north-east, the Plough in Ursa Major, the Great Bear, is standing on its handle. If you follow the two pointer stars on the right of the Plough upwards they point to Polaris, the pole star which is always due north and all the other stars appear to revolve anti-clockwise around it. Follow the pointers the wrong way, downwards, and you will come to Leo the Lion. To the left of there, on Friday night is where 2012 DA14 will be seen, or at least the clouds obscuring it from view!